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Presents implications of recent studies which have as their major concern the measurement of student characteristics and the changes in characteristics. Discusses particularly those studies dealing with variables other than the two standby ones—scholastic ability and achievement. Stresses opinion that new and improved measures of attitude, motivation, and personality traits might serve as useful predictors and criteria of college success.

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IV. Implications for Institutional Research of Studies on Student Characteristics

. . . . . Paul C. Heist

Some of you perhaps remember seeing a cartoon in one of the more prominent magazines in which a father puts down his newspaper, glares at his son who has recently returned home from college, and asks, "What are they studying in college these days besides you?" At the Center for the Study of Higher Education at Berkeley we have also come to feel at times like this father, and humorously refer to "the new subject matter in education," namely, the college student. I will not list or describe the few rather extensive studies of the past decade or two, or some of the increasing number of studies of the past three or four years, which have as their major concern the characteristics of students and the changes in such characteristics. Many will be acquainted with the report by Phillip Jacob, Changing Values in College, in which he reviews and summarizes such research up to the year 1956. Certainly the Jacob publication must be credited with having aroused concern for the values and attitudes supposedly accruing from education.

Not necessarily in contradiction with the trend implied in the above comments, I noted in reading the WICHE report titled Institutional Research in the West that studies of student characteristics were not flourishing in most western institutions. Twenty-four per cent of all research projects and studies reported through the questionnaire did in some way deal with students, but only 17 studies were completed or under way in which characteristics other than level of ability or degree of achievement were the major variables. Thus, only 11 to 12 per cent of the research dealing with students examined attitudes, interests and personality traits; this may be a slight over-interpretation, but in the remaining 89 per cent of the studies the titles indicated that these were specific to the two old stand-by variables, scholastic ability and achievement. The 17 studies noted amount to 2.8 per cent of the 600 stuides reported on all aspects of institutional research, and many of these were limited to subgroups or small samples of students on any one campus. Longitudinal research, that is, analysis of development or behavioral changes over time, was reported in only 4 of the 127 institutions.

One would have to confess to some amazement regarding these facts, even when allowing that this study is based on an incomplete sampling. If one doubled or tripled the 2.8 per cent, one could still infer a limited concern with evaluation (at least evaluation more broadly

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conceived) for the immediate product of education, the individual student. For a great many schools, the aforementioned question of a father to his son does not yet have any relevance. This is not to imply that there is no value in the fairly numerous predictive studies and all those using academic ability measures, grade point averages and achievement test scores.

Undoubtedly, the course grade and grade point averages will continue to serve as chief criteria of college success. But the handwriting seems to be on the wall for expansion beyond this area of great replication. Joshua Fishman recently reported in a paper on "Non-Intellective Factors as Predictors, as Criteria and as Contingencies in the Selection and Guidance of College Students: A Socio-Psychological Analysis" that the results from a survey conducted by staff of the College Entrance Examination Board on all selection and guidance studies in the 1948-1958 decade show that over 70 per cent of the studies dealt with intellective variables; that is, ability and intelligence test scores, achievement test scores, high school rank, and various compilations of grades. But he believes that the 29 per cent of research in this past decade which did include one or more nonintellective variables is a sign of a new and important trend. He predicts in the paper that this trend "will become accentuated in the decade immediately ahead." A number of major multivariable projects presently under way, both in single institutions and across a number of institutions, lend support to Fishman's conjecture.

Another sign of the times is the provocative activity in the past year of the Committee on Personality Development in Youth and its subcommittee on College Peer Groups, sponsored by the Social Science Research Council. Possibly a "new tomorrow" in education has arrived. The time seems opportune and the need is repeatedly being expressed for more comprehensive ways of assessing and evaluating the gains and changes resulting from the college experience. Harold Webster and myself, in a paper on "Differential Characteristics of Student Bodies with Implications for Selection and Study of Ungergraduates" have argued, along with others, that new and improved measures of attitude, motivation and personality traits might serve as useful predictors and criteria of college success. Such measures might well be utilized in research on applicants and entering students, in research leading to refinement of selection procedures, and, pending validation within specific institutions, in facilitating the differential education of students.

These opening remarks represent a plea for more broadly conceived and more comprehensive research on students and student characteristics and on the influence and impact that make for the most effective and most meaningful education and change. Following is a presentation of some rationale for this plea.

Values of Inter-Institutional Research

Most of the present research at the Berkeley Center on colleges and college students is best described as inter-institutional as compared to intra-institutional. Work of the former type in no way obviates the importance of the latter, and the objectives might well be identical or similar for much of the research of both types. However, there are certain fairly obvious advantages inherent in research across several or many institutions.

Total classes in numerous institutions represent an adequate population about which data can be collected; the researcher avoids work with unrepresentative small numbers of students in any of a variety of analytical subcategories. This is a distinct advantage when employing the multivariate analysis approach of the sociologist or when attempting to match samples on several variables at once. Further, use of several or more colleges provides essential "controls" for more meaningful analysis of any one college.

Of more importance and direct pertinence for the individual institution participating in research across two or more schools are the comparative analyses permitted: e.g., comparisons of total student bodies, total entering classes, or other more specific student subcultures; analyses like Burton R. Clark's in "The Influence of Organization Image on Student Selection" of the reasons for students' selection of different institutions, the processes by which selection is made, and the effect of selection procedures on the varying student bodies; or, the impact of different schools on individuals of similar and different characteristics. The matter of varying productivity among colleges, especially in those graduates following intellectual or academic pursuits, can only be analyzed by involving schools of some variation in productivity. In one of the present projects at the Berkeley center, a diligent attempt is being made to discover the contributing factors underlying the much greater production of scholarship in a relatively small number of colleges and universities in our society.

The examination of many other problems and questions is enhanced by a more comprehensive inter-institutional approach. Study of creative activity and its possible development in college youth almost necessitates investigation of a variety of educational environments. Studying the development of students of superior ability or with particular talents and the factors which facilitate their best efforts can only be done through sampling at a number of colleges. The problems of underachievement or academic failure, of high withdrawal rates, and of student decisions regarding academic major and future vocation have all grown in importance as we attempt to be more discerning about whom to recruit or admit to our respective halls of learning. They, too, are best attacked through an inter-institutional approach.

Paul A. Heist

Large Scale Data Collection

The methodology, the tools of assessment, and the problems of analysis in social science research are imposing and expanding topics, of and by themselves; this is true whether a sample be large or small, whether the field of study is one school or many. To use a single example, what one might view as the relatively simple problem of reliability of measurement, presumably once resolved as far as many were concerned, is presently undergoing considerable revision at the hands of a number of measurement experts. I would cite as cases in point two articles: Harold Webster's "A Generalization of Kuder-Richardson Reliability Formula 21" and Frederic M. Lord's "An Approach to Mental Test Theory."

Further, members of our own research team at the Berkeley Center would urge that investigations on human variables which are important in an educational context be planned within some theoretical framework. Though admittedly there may seem to be only limited agreement on any general system or body of theory, even within a single discipline in the behavioral sciences, the recent work of several research organizations in the design of studies and in the formulation of questions and hypotheses indicates that representatives from education, psychology, sociology and anthropology might agree on some basic theoretical understructure or perspective. Studies involving a comprehensive approach and some common theory regarding human development and change will allow for more complete answers to whatever questions are raised. To be of value, studies of students need not necessarily incorporate the help of persons from several disciplines; however, consultation with these persons would seem to be a positive step in the attainment of more unified theory and more meaningful and fruitful data.

Any research on students in the college or university domain--whether on the type of students drawn or selected, on students' choice of various major programs, on student failures and withdrawals, on the changes and attainments of those that stay, or on the characteristics of those that continue in graduate work--should be related to the objectives of the institution, to the objectives of a specific major department and to the function of education in our total culture and the various subcultures. Only through such rigorous research planning will most institutions redefine their purposes to fit conditions in our rapidly changing world.

The tools or instruments of research exist in great abundance. Inventories, tests, check lists and rating devices are available in an almost unending variety, most of which lend themselves to administration with large groups. Questionnaires, opinionnaires and schedules are to be had for the asking. Unfortunately, the reliability and validity of many of these measuring devices leave much to be desired. The use of any single inventory or questionnaire requires a check on the information and the results obtained through the use of other approaches and other measures of the same behavior. Second only to

the objectives and design of research, much thought and foresight must be given to these means of measurement and assessment.

Some of the established and well-known measuring devices are inappropriate for research in an educational setting, chiefly because of their construction for other purposes; therefore researchers in higher education have developed or assembled new instruments. A few examples of this trend are the following: George Stern's revision of the major variables on the Inventory of Beliefs (described in his book, Methods in Personality Assessment), and his more recent development of the Activities Index, as described in his Preliminary Manual for the Activities Index and College Characteristics Index; Robert Pace's development of the College Characteristics Index, discussed in his A Criterion Study of College Environment; the development of the VC Attitude Inventory at Vassar, explained by Harold Webster in VC Attitude Inventory and VC Figure Preference; and the work on the Omnibus Personality Inventory at the Center at Berkeley explained in the Manual for the Omnibus Personality Inventory by Phoebe Williams and myself, and in "Construction of a Multiple Trait Personality Test for Use with College Populations" by Harold Webster and myself.

Partly through a concern with high ability students, but also as a result of contemplated research on students in general, the efforts of a number of our staff have gone into building and refining a personality inventory, several questionnaires, and a number of other subsidiary devices. Both the personality inventory and the questionnaires contain a number of scales and items with specific relevance to attitudes and motivation toward intellectual goals and to other behavior theoretically significant in an academic situation. Illustrative data from one of these will be presented in the latter part of this paper.

For the most efficient and meaningful research, a great deal of attention must be given to the design of studies and projects. "Getting the facts" in any area is a process plagued with evanescence and delusion. The general design must contain provisions for "controlled" comparisons and a variety of approaches to the same behavior, both referred to above. At the Center, for instance, when we identify potentially creative students (or failing students, or withdrawing students) at several campuses, and then attempt to assess their behavior and its changes, we work in both a cross-sectional and longitudinal fashion, and we employ several measuring techniques.

Studying Students and Student Characteristics

Students are the chief commodity of the educational venture, even though growing attention to a variety of seemingly tangential efforts might lead us to wonder if students are not somewhat incidental to the over-all process. To iterate the point of the introductory remarks, the study of college students in any comprehensive sense, or of groups of students as cultures or subcultures having potential impact for change, has a rather meager history; but we now seem to be in a

transitional period and in the next decade greater funds and much energy will be expended on investigation of many aspects of student life.

Sound and legitimate reasons for studying human beings are certainly not difficult to derive, and it is therefore all the more amazing that this wealthy area for observing human behavior--that is, college experiences and student life--has only been superficially tapped.

Objectives for studying students may be diverse from those for human behavior in general, chiefly because education is only one facet of our society and because education is viewed as a temporary phase in a person's life. But whatever the particular merits of research limited to samples of college students, most of the major objectives perhaps apply in varying degrees to most campuses. Some objectives seen as particularly significant in guiding the earlier research at the Center are the following. These were discussed for the most part by Dr. T. R. McConnell, Chairman of the Center, and members of a planning committee, long before any of the projects had gotten under way.

> How much diversity in student characteristics exists among the student bodies of various colleges and within the student body of any one college? Is the existing diversity, whatever it may be, of importance in the educational process and related to the goals achieved in the varying college environments?
>
> What are the varying background factors (socioeconomic, cultural, religious, and educational) of students in different institutions and of those within single institutions that: (1) relate to certain sets of characteristics and different degrees of academic motivation? (2) relate to or predispose to different levels of aspiration and different areas of interest? (3) relate to the fact that the majority of entering students have seemingly "learned not to learn" and only a minority are intellectually oriented?
>
> To what extent do the objectives and the over-all programs (curricular and extracurricular) of particular situations provide for or accommodate the diversity of students existing on the campuses?
>
> What degree of diversity (what level of homogeneity-heterogeneity) within any student body leads to an optimum learning environment for the "pursuit of excellence"?
>
> How may the measured diversity in student characteristics in any college be utilized in differential educational procedures--for example, selection of candidates for honors seminars and undergraduate reading courses or special considerations for the potentially creative?

Are there important differences in the personality characteristics and in the scholastic motivation of students who major in various programs? In those continuing in graduate programs? Would such measured differences, if any, be great enough to justify varying educational procedures and objectives?

What are the characteristics and what are the motivational patterns of gifted students and creative students that might more uniquely be utilized in their education?

Hypotheses relative to and derived from the above questions and the present theoretical framework of the research at the Center would probably be of interest, but space does not permit expansion on that theme. To give some meaningfulness and import to several of the above questions and to illustrate implications, data from a few projects at the Center have been utilized. This review will be cursory and of necessity somewhat superficial.

Implications from Research on Students

A brief look at diversity on the single variable of academic aptitude provides a good starting place. The premise underlying questions about diversity is that the greater percentage of institutions of higher education, if not all, should be concerned with and "understand" the heterogeneity of student ability within the single college or university, and that a smaller percentage of schools should view and educate their total student body as a group significantly higher or lower in ability than most student bodies. The data considered here are taken from a study by John Darley and others, done with the Center, on the scholastic aptitude of entering students of 1952 in a stratified, representative sample of the more than 1800 institutions in higher education. The mean ACE total score for the more than 60,000 entering freshmen in this national sample was 104.45 and the standard deviation was 27. The range of institutional means for the 200 institutions in the sample is four standard deviations (using the standard deviation of the individual score distribution). This encompasses the measured ability levels of about 97 per cent of individual students. Less than three per cent of the students score at extremes beyond actual means for total institutional groups. When considering only four-year, non-Negro colleges in this national sample, we still obtain a distribution of means 2 3/4 standard deviations long. Except for the South, the ranges of institutional means within major geographical regions encompass at least two standard deviations. It would appear that high school graduates of great variations in ability can find colleges whose student bodies approximate their specific levels.

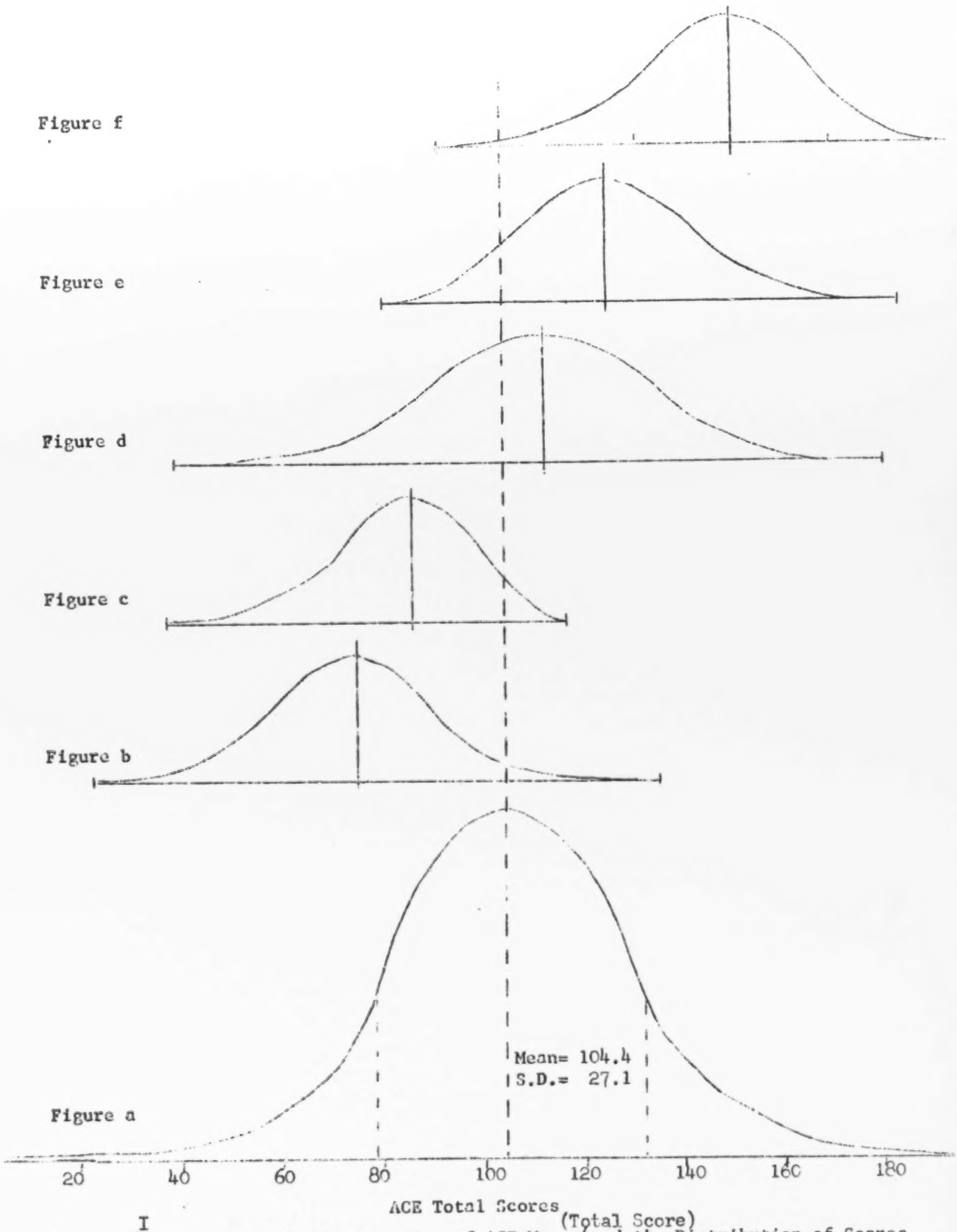

Figure IV. Diagrammatic Presentation of ACE Means and the Distribution of Scores of Entering Freshmen in the Total Sample and in Selected Institutions from a National Sample of American Colleges and Universities (Fall of 1952)

Plotted distributions for the total national sample referred to above and for five individual colleges are presented in Figure I. All five, located in the northeast and north central regions, are four-year, liberal arts institutions. These graphs do not represent unusual four-year colleges in American higher education, and any of the four major regions of the country has numerous examples of those illustrated by Figures c, d, and e. The top graph (Figure I) is a more unusual college, and the Northeast seems to have almost a monopoly of the schools with mean scores above an ACE T score of 135.

A great variety of interpretive and speculative statements can be made regarding the diversity pictured and described above. A few comments might serve to lead the reader to other considerations and implications. If restricting ourselves to the two colleges at the top, e and f, both having large proportions of high ability students, we note that the students in the bottom 50 per cent of College e are very much unlike those in the top 50 per cent of College f. Only the lower 14 per cent of the students in the latter college have aptitude scores like those of the lower 50 per cent in College e. Using College e again as a reference, one notes that about 84 per cent of the students have ability scores unlike those of 84 or more per cent in colleges represented by Figures c and b. In the latter two cases we find no students that could be described as superior in measured ability, and the definition of superior students would very likely be different in Colleges d, e, and f. College d, whose score distribution almost encompasses the ranges of the other four, is the most typical of higher education in the heterogeneity represented. In colleges such as this, many classes are composed of students whose IQ's vary over 40 to 50 points. Further discussion of these matters can be found in an article by myself entitled "Diversity in College Student Characteristics."

At the Berkeley Center, we would view five colleges such as these as having rather distinct educational environments, even when limited to these comparisons on the ability variable alone. This is based on an assumption that the students are a key factor in determining these institutional environments. Needless to say, the picture of diversity becomes much more complex when we add the differences found in other personality characteristics.

As a brief introduction to some personality characteristics viewed as important in academic environments, mean scores on selected scales* for

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*Brief scale descriptions and sources:

Thinking Introversion: Liking for reflective thought, particularly of a more abstract nature. Thinking which is not dominated by objective conditions and generally accepted ideas. (Evans-McConnell TSE Inventory)

Complexity: Sometimes called "Complexity of Outlook." Tendency to perceive and to react to the complexity of the environment, rather than to function at a level of greater simplicity. Tolerance for ambiguity and novelty. (Barron, IPAR, and Center for the Study of Higher Education)

Originality: Preference for an organized mode of functioning which emphasizes unusual responses, but which is not generally unrealistic or maladaptive. Associated with independence of judgment, freedom of expression, novelty of construction and insight. (Gough, IPAR, and Center)

Social Maturity: A personality syndrome having its origin in responses to nonauthoritarianism items and their correlates. This measure necessarily increases with increasing amounts of social maturity but is at the same time increasingly insufficient to describe it. It is correlated with age, at least in college populations. High scorers tend to be uncompulsive, impunitive, independent, unconventional, agnostic, uncynical, unromantic, and not subject to feelings of victimization; in addition, they possess genuine curiosity and an interest in intellectual and esthetic matters. (Even though the trait is so complicated, its reliability exceeds .90--Vassar-Center.)

Authoritarianism (F-scale; 28 items of Form 45/40): Anti-democratic beliefs. High scorers tend to be conventionalistic, rigid, prejudiced and emotionally and intellectually suppressed. In addition, their personal security is based upon identification with power, as represented by in-group leaders, and upon rejection of out-groups. (Adorno, et al. The Authoritarian Personality)

Social Introversion: Discriminates among those who tend to withdraw from social contacts and relationships and those seeking them and finding satisfaction therein. (Drake-MMPI)

Impulse Expression: The general readiness to express impulses, and to seek gratification in either conscious thought or in overt action: ascendance, sensation-seeking, endocathection and intraception, and radical sentiment. (Sanford-Webster-Freedman)

Responsibility: High scorers tend to be perceived as socially responsible. (Gough-Meehl-McClosky)

National Merit Scholarship (NMS) winners and for male students in several colleges in California are presented in Table 1. (The scores are in the form of standard scores; these were established on a large freshman class whose average ability was approximately at the national mean of 105.) All scales have been or are included in an omnibus inventory (OPI) assembled for research purposes.

Table 1

Standard Scores on Some OPI Scales (original instruments) for the NMS Sample and Other College Freshman Groups (Males)[1]

Scale	NMS Males	California Institution No. 1	California Institution No. 2	California Institution No. 4
Thinking Introversion	64.5	47.5	55.5	53.0
Complexity	57.0	46.0	54.5	62.0
Originality	59.0	46.5	54.5	57.0
Social Maturity	62.5	47.0	55.0	59.0
Authoritarianism	45.0	56.0	50.5	46.0
Social Introversion	51.5	57.5	54.5	54.0

[1]The standard scores are computed with a mean of 50 and a standard deviation of 10 using a sample of college freshmen whose mean ability score is at the national mean for entering students.

In Table 1, Institutions No. 1 and No. 4 both have mean ability scores very close to the national freshman mean, but rather large nonintellective differences appear on the following scales: Thinking Introversion, Complexity, Originality and Authoritarianism. On the last three scales the differences are of a magnitude of one standard deviation or greater. The scores of Institution No. 4, except for the first scale, are most like those of the National Merit Scholarship winners, the latter group being very different on the ability variable. Research results have shown that scores on these scales are closely related to a student's motivation or orientation toward intellectual pursuits and to his activity within an academic environment. However, such a motivational pattern, especially as indicated by the latter three scales, does not necessarily correlate with grade-getting. In

contrast to Nos. 1 and 4, the mean aptitude score for Institution No. 2 is approximately three-fourths of a standard deviation above the national mean.

The typical male student in Institution No. 4, whose Thinking Introversion score is near the average of the reference group, is most likely not scholarly in an academic sense but, judging by the other scores, could be characterized as complex in his orientation, as independent, free-thinking, somewhat rebellious and perhaps not a good candidate for colleges with "restricted" student life. Students in Institution No. 1, on the other hand, might be seen as fairly typical of a great many students in our "halls of learning," not motivated academically and not really interested in the acquisition of knowledge. On the basis of additional measurements known to the author, their orientation or quest in college could be curtly described as "applied." We would suggest and contend that these apparent differences in two student bodies are indicative of two different student peer cultures, two different psychological climates (neither of them perhaps conducive scholastic climates), and that existence in such different academic and social contexts would produce different effects on the continuing motivation of individuals. Dr. McConnell and myself have discussed these matters further in an article entitled "Do Students Make the College?" From such obtained differences it seems advisable that research in many colleges should include some analysis of the personality patterns and the psychological climate of student bodies *per se*.

The significance of differences among institutions on these personality traits which are viewed as measuring an intellectual disposition is also demonstrated by the scores for two liberal arts colleges found in Table 2. The table appears in Heist and Webster's article on "Differential Characteristics of Student Bodies with Implications for Selection and Study of Undergraduates." The mean aptitude levels of the male student bodies in these two schools are approximately the same, over one standard deviation above the national college average. Though the scores on the first four characteristics are high for both schools, the consistency of the differences on the five scales, that is, the pattern of higher scores in College No. 1 over those of No. 2, causes speculation regarding a more provocative climate in the first college. However, the speculations have some external confirmation; observations of student life and a variety of other data indicate the general intellectual intensity of activity on both campuses, but the fervor on one is definitely shared by more individuals. Incidentally, the freshmen in a college like No. 1 score higher on most of these measures at time of entrance than the seniors in many another college.

Table 2

Mean Standard Scores on Selected Personality Scales for Male Freshman Students in Two Liberal Arts Colleges[1]

Scale	Means	
	College No. 1	College No. 2
Thinking Introversion*	63.1	58.1
Complexity*	66.1	60.1
Originality*	64.5	58.1
Social Maturity**	68.8	61.8
Social Introversion**	52.0	48.2

*Significant at the .01 level

**Significant at the .05 level

[1]The standard scores have been computed using a sample of freshman men whose mean ability score is at the national mean for entering students.

When institutions such as these presented in Table 2 and No. 4 in Table 1 are apparently selective of many students with certain distinct attitudes and interests, there is even greater reason for wondering about the prominent subgroups on these campuses. Whether or not subgroups or subcultures are at all identical from college to college, a research concern for the categorization of any total student group might do much more than lead to the identification of the gifted, the potential scholars, and the potentially creative. Determination of the subcultures on any campus, however they may be categorized, and studies of the development and changes in students in these different groups, could possibly permit us to isolate some of the reasons facilitating or hindering effective education and effective change in attitudes and values. It has been suggested and discussed by Benno Fricke, in "Prediction, Selection, Mortality and Quality Control," that research on students should lead to better matching of type of institution and "type" of student. Others have gone so far as to ask whether it would not be advisable to quicken the "main stream" of some student bodies by placing small groups of highly or differently motivated persons there to serve as catalysts. Any such attempts demand much greater understanding of existing student groups and a greater concern on the part of admissions and personnel staff.

Whatever most schools do to accommodate the greater numbers of the ensuing decades, all institutions will need to pay more attention to specific students and "types" of students. Many colleges may desire to be more selective or be forced to such a policy; other institutions working with thousands and tens of thousands will need to become more discerning about the heterogeneity of their student constituency. A number of colleges, already very selective relative to the ability and achievement of students, are attempting to backtrack a little and are seeking other variables to assist in the decisions made by admissions committees. At the Berkeley Center we have begun to examine whether some motivation or personality measures have sufficient potency and relevance to be used either as selection or classification criteria. Our initial work might be illustrated in various ways and with a number of scale combinations; some data resulting from classification of students through a particular composite of three scales will be utilized here.

Quoting from the Heist and Webster article on "Differential Characteristics of Student Bodies with Implications for Selection and Study of Undergraduates" in which this material is discussed, "We selected samples of high ability students who were either high or low on the following three scales: Thinking Introversion, Complexity, and Originality. To some degree any of these measures would identify students who had intrinsic interests in knowledge and in intellectual activity for its own sake. We wanted to study the differences between groups of students whose scores were at least half a standard deviation above or below the mean on all three of the scales.* The mean standard scores in Table 3 are on samples of National Merit Scholarship winners (males only) who were classified in this fashion into two groups. The High Group might be viewed as genuinely interested in learning (by definition of the criterion scales) and the Low Group as much less so interested, if at all, though this is seemingly paradoxical in view of their high ability and their high school achievement record. It would perhaps be more accurate, or fairer, to describe the Low Group as interested in a different kind of learning. On measures of socioeconomic background and mathematical aptitude these two groups appeared to be identical. Scores for both on scales from the Minnesota Multiphasic Personality Inventory made one group appear as "normal" as the other.

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*Miss Phoebe Williams, from the Center staff, is to be credited with much of the analysis of these data.

Table 3

Mean Standard Scores on Selected Personality Variables for Groups High and Low on Three Scales (TI-Co-O) Measuring Intellectual Interests (N's = 40 Males Each)[1]

Instruments and Scales	High Group Mean	Low Group Mean	Difference
OPI			
Social Maturity	56.4	41.0	15.4*
Authoritarianism	35.2	56.0	-20.8*
Social Introversion	42.3	50.1	-7.9**
Impulse Expression	46.3	38.2	8.1*
Responsibility	62.2	56.3	5.9*
Study of Values			
Theoretical	64.1	57.6	6.5*
Economic	38.2	53.5	-15.3*
Aesthetic	59.4	41.3	18.1*
Social	43.6	43.4	0.2
Political	49.5	50.5	-0.9
Religious	46.7	53.0	-6.3*

*Significant at the .01 level

**Significant at the .05 level

[1]The standard scores are computed with a mean of 50 and a standard deviation of 10 using a large population of college freshmen as the base distribution for the Study of Values; for the OPI scores a random sample of University of California male freshmen serve as the base group.

Looking at the actual scores on other sclaes found in the OPI and Gordon Allport's Study of Values (Table 3), the numerous significant differences readily demonstrate how much the two groups vary. Summarizing on the basis of the major differences, they add up to having in the High Group students with greater maturity and general sophistication, greater freedom and flexibility in thinking, greater sensitivity to artistic aspects, a willingness to relinquish traditional or fixed values, and a greater readiness to examine the new and the different. One major investigation at the Center has revealed many students with scores like those in the High Group attending colleges ranking high in the productivity of scholarship (ranks determined by the Knapp and Greenbaum criteria as discussed in their The Younger American Scholar).

The figures in Table 4 readily indicate that the academic majors for the two groups are also considerably diverse. Only about 12 per cent of the High Group initially entered Engineering, with the largest concentrations in the theoretical sciences and in subject areas which might appropriately be described as the life sciences and the humanities.

These data are similar to the kind of information that student personnel people have been aware of for a long time and often utilize in their counseling capacities. One might pertinently ask if they are possibly of additional value. For example, supposing a college staff becomes aware of the dominant characteristics and motivational patterns of its students, how many persons of either the Low or High Group can they readily absorb? As implied above, too many of the latter group would probably be hard to come by, but would too many of the Low Group, at any level of ability, add a stultifying component to a small campus? A number of colleges can presently be identified where Low Group students would be rather sadly misplaced; such institutions might use the three scores from the classifying scales as a final criterion for rejection. Looking at this from a reverse direction, in those cases where a person's high potential and unique motivation are recognized, how many institutions would refuse admission and recommend a more appropriate educational environment for this person? More generally, and looking at the two groups from the standpoint of typical American colleges, (1) what attempts are presently made to identify those with either degree of intellectual motivation? (2) What provisions exist in the curriculum and in the teaching staff for educating students of such widely diverse motivational sets? The speculative aspects of the above conjectures and questions are very apparent but suggestive of some of the great variety of research on students which remains to be done.

Student Characteristics and the College of Tomorrow

In the "new tomorrow" of American higher education, some considerations of the total program will continue to be: the greater number of students, increased scholarship programs and the granting of scholarships, expanding institutional research, and more diligent assessment and evaluation of students. The last might easily develop and increase

Table 4

Choice of Academic Major for Members of Groups High and Low on Three Scales (TI-Co-O) Measuring Intellectual Interest (N's = 40 males each)

Major Field	High Group N	High Group Percentage	Low Group N	Low Group Percentage
Engineering	5	12.5	25	62.5
Mathematics	7	17.5	0	0.0
Physics	6	15.0	3	7.5
Biology	2	5.0	0	0.0
Psychology	3	7.5	0	0.0
Sociology	1	2.5	0	0.0
Economics	0	0.0	6	15.0
History	6	15.0	0	0.0
English	3	7.5	0	0.0
Music	3	7.5	0	0.0
Industrial Design	1	2.5	0	0.0
Radio-TV	0	0.0	1	2.5
Business	0	0.0	1	2.5
No Choice	3	7.5	4	10.0

to the point of inciting student rebellion, but, beyond any doubt, more and more colleges and universities will take more frequent and more diligent looks at their students.

As institutional staffs become aware of the differences among students and student groups, and cognizant that a larger number of criterion and predictor factors can be measured, much more time and effort will go to studying and attempting to understand the students and the most conducive learning environments. To date, only minimal attempts have been made "to know" and to accommodate the great diversity in students. Differences in institutional structure will probably not change greatly with the large influx of students; certainly the same is true of differences in student characteristics. There continues to be a clear need to study what kinds of situations and environments do what for different types of people.

Fundamental changes in values and attitudes are probably not possible for all students, but even for the potential changers it would seem advisable to look at the circumstances and conditions of change. In general, far too little is known about the development and education of all students, beyond the acquiring of knowledge and skills. What students change? How do they change? What are the factors related to change? These and other questions need the attention of many more research persons in a variety of environments.

In many small colleges, a "proper" selection of students will probably be as effective a step to an improved climate for learning and scholarship as the attention given to selection of faculty. A major variable underlying the impact of certain institutions and any change in students is the students who select and who enroll in the institutions. The total college milieu may be changed or improved most quickly by changing (through recruiting, selecting, admitting) the student composition. For a majority of institutions this may seem virtually impossible. Therefore, special attention to differential treatment of students within institutions merits particular consideration.

Students in any institution should be seen and understood within context of the other students or the predominant peer culture. Their level of motivation, their interests, and their potential for growth are in large part determined by reactions and recognition from their immediate peers.

Measuring, analyzing, and understanding the motivation and personality of students are still in the frontier stages, but it is possible to measure a pattern of variables related (1) to intrinsic interest in learning and to motivation toward scholarly achievements, (2) to the choice of type of institution attended, and (3) to the particular subgroup affiliation within total student bodies. Research to determine the correlates of these three should add considerably to the understanding and education of students on any campus.